

# **Rhode Island Drought Management Plan EXECUTIVE SUMMARY**

**JUNE 2002**

## **Background**

This plan was developed to provide the State of Rhode Island with a policy guide and framework for coordinated responses in times of long-term drought. The framework sets up a coordinated response for the state to be overseen by the Rhode Island Water Resources Board as advised by a Drought Steering Committee.

Drought is a natural hazard that evolves over months or even years, affects a specific area or an entire spatial region, and causes little structural damage. Generally, a drought can be defined as a continuous period of time in which rainfall is significantly below the norm for a particular area. This period could be as short as one summer, or as long as several years. Although the State of Rhode Island is often considered a “water-rich” state, it can experience extended periods of dry weather, from single season events to multi-year events such the long-term drought of the mid-1960s.

The 1993 Rhode Island State Guide Plan Element #723, *The Rhode Island Water Emergency Response Plan*, recommended that the state develop a separate drought plan. In addition, during a short drought experienced in the spring and summer of 1999, the need for such a plan was reinforced. The Water Resources Board convened a Long-term Drought Management Task Force to develop a drought management plan for the state. The State Planning Council adopted this plan as an element of the State Guide Plan on June 13, 2002.

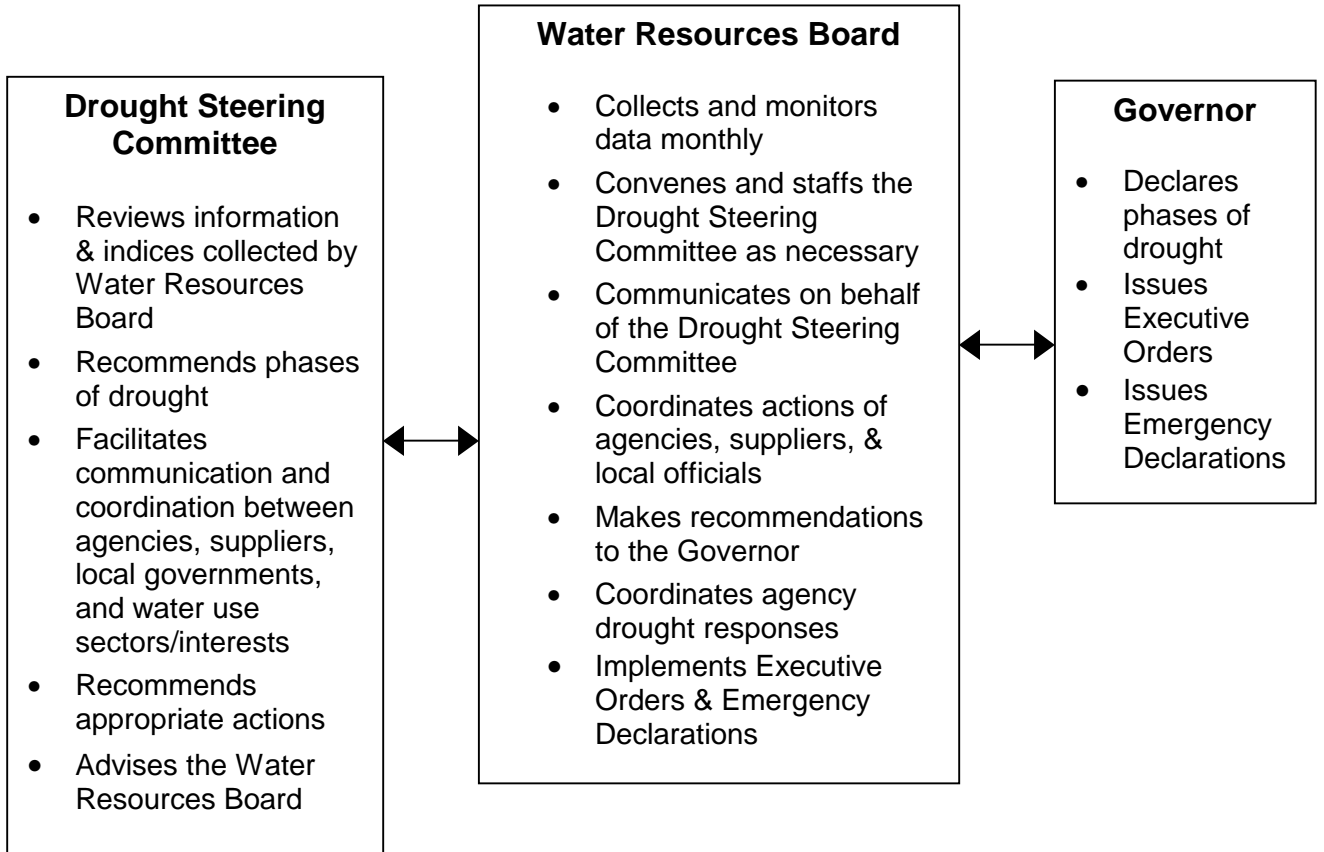
## **The Drought Management Process**

The primary responsibility for coordination of the drought management process and implementation of this plan rests with the Water Resources Board, as advised by a Drought Steering Committee. The Drought Steering Committee is convened by the Water Resources Board and includes agencies which routinely collect and monitor data critical to assessing drought phases in the state, as well as federal and state agencies, local water suppliers, and community officials. The Water Resources Board is responsible for maintaining a current membership/contact list, monitoring conditions, convening the Drought Steering Committee, and recommending to the Governor to declare the appropriate phases of drought. The following chart illustrates the management process as coordinated by the Water Resources Board.

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### Rhode Island Drought Management Process



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### **Drought Phases**

The Plan defines five phases of drought consistent with the Drought Watch/Warning System of the National Weather Service:

1. Normal.
2. Advisory
3. Watch
4. Warning
5. Emergency

The Drought Steering Committee will recommend phases for the state based on hydrological and meteorological indices. The Water Resources Board will advise the Governor of the need to set the appropriate phase of drought. Exceeding the threshold of a particular phase establishes grounds for recommending moving to the next phase. Each phase requires increased action and coordination by the Water Resources Board as advised by the Drought Steering Committee. Table 724-(2), Rhode Island Drought Indices and Phases, shows the thresholds for each phase and the relationship of all of the drought phases.

A given drought phase can change in one of three ways. If conditions worsen and reach the criteria for the next most severe drought phase, a recommendation that the drought severity level be increased accordingly will be made by the Water Resources Board to the Governor. If conditions persist but do not reach the next level, the drought phase will be held constant. If conditions begin to improve, the Drought Steering Committee will recommend whether conditions have returned to normal. Once the precipitation index triggers a drought phase of warning or emergency, conditions must improve beyond the previous level to reduce the drought phase.

### **Drought Regions**

The plan delineates seven drought-planning regions for the state (See Figure 724-(4), page 4-16.) The normal, advisory and watch phases are issued on a statewide basis. The more severe warning and emergency phases are issued on a regional basis, taking into consideration local hydrological conditions, sources of drinking water supplies, and infrastructure considerations.

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**TABLE 724-(2) Rhode Island Drought Indices and Phases**

<b>Drought Phase</b>	<b>Palmer Drought Index +</b>	<b>Crop Moisture Index</b>	<b>Precipitation +</b>	<b>Ground Water** +</b>	<b>Stream flow +</b>	<b>Reservoirs**</b>
Normal	-1.0 to -1.99	0.0 to -1.0 Slightly Dry	1 month below normal	1 month below normal	2 consecutive months below normal	Reservoir levels at or near normal for the time of year
Advisory	-2.0 to -2.99	-1.0 to -1.9 Abnormally Dry	2 month cumulative below 65% of normal	At least 2 out of 3 months below normal	3 consecutive months below normal	Small index Reservoirs below normal
Watch	-3.0 to -3.99	-2.0 to -2.9 Excessively Dry	1 of the following criteria met: 3 month cum. < 65% or 6 month cum. < 70% or 12 month cum. < 70%	4-5 consecutive months below normal	At least 4 out of 5 consecutive months below normal	Medium index Reservoirs below normal
Warning	-4.0 and below	> -2.9 Severely Dry	2 out of 3 of the above criteria met: 3 month cum. < 65% and 6 month cum. < 65% or 6 month cum. < 65% and 12 month cum. < 65% or 3 month cum. < 65% and 12 month cum. < 65%	6-7 consecutive months below normal  observation wells recording monthly record lows	At least 6 out of 7 consecutive months below normal	Large index reservoirs below normal
Emergency	-4.0 and below	> -2.9 Severely dry	Same criteria as Warning and Previous month was Warning or Emergency	>7 months below normal observation wells recording monthly record lows	>7 months below normal	Continuation of previous month's conditions

**+** Major hydrologic indicators.

**\*\*** Local triggers from the water system supply management plans will also be considered in assessing drought phases on a regional basis. The Water Resources Board will review local plans and work with suppliers to coordinate regarding drought phases and to collect, review and report surface reservoir and ground water data.

**Normal** is defined as the statistical average of the data for the period of record. Percentages for precipitation are relative to normal.

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### Data Collection and Monitoring

The plan identifies the various agencies that can provide information to be used by the Water Resources Board and the Drought Steering Committee to assess the severity of drought conditions in the state. The Water Resources Board is responsible for assembling the necessary information and providing it to the Drought Steering Committee. The Board is to publish a monthly “Current Conditions Report” which summarizes current water resource conditions, and provides data on ground water levels, surface water, reservoirs, precipitation, stream flow conditions, fire danger, and agricultural conditions. A description of the data typically available from each agency is provided in Table 724-(2), Information Collection.

**TABLE 724-(2)**  
**INFORMATION COLLECTION**

<b>INFORMATION</b>	<b>AGENCY</b>
Ground water levels, surface water levels, and stream flow conditions Surface water flows for rivers receiving major RIPDES discharges	United States Geological Survey Water Resources Board Department of Environmental Management
Extended weather forecast (3-month intervals). Summary of historical comparisons	National Weather Service University of Rhode Island
Precipitation data	National Weather Service University of Rhode Island
Wells both static and pumping levels	Water Suppliers Water Resources Board
Suppliers with restrictions and water emergencies	Water Resources Board
Scituate Reservoir level	Providence Water Supply Board
Levels of other major reservoirs	Water Resources Board
Forest fire conditions and fire danger levels	Department of Environmental Management State Fire Marshal's Office
Crop, soil, and agriculture conditions	Department of Environmental Management United States Department of Agriculture RI Agricultural Council
Regulated utility issues	Division of Public Utilities and Carriers Public Utilities Commission
Public health and drinking water quality issues	Department of Health
Drought indices	Water Resources Board
Impacts to ecosystems, flora, and fauna	Department of Environmental Management Designated Watershed Associations

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### **Communication**

The plan establishes responsibilities for coordinated communication of drought response between state and other agencies, with a goal of providing accurate, timely and consistent information to the public. The Water Resources Board is primarily responsible for recommending to the Governor the appropriate phases of drought and implementing the recommended actions of the Drought Steering Committee. Table 724-(4), Communication of Drought Steering Committee Recommendations summarizes the communication responsibilities and identifies the target audiences for each agency.

**Table 724-(4)  
Communication of Drought Steering Committee Recommendations**

<b>Agency/Organization</b>	<b>Audience</b>
Water Resources Board Governor's Office	General Public
Water Resources Board	Watershed Councils, Local Government
Water Suppliers Rhode Island Water Works Association	Customers, Water Resources Board
Water Resources Board Department of Health	Water Suppliers
Department of Environmental Management	Foresters
Department of Environmental Management RI Agricultural Council	Farmers/Agricultural Interests
Water Resources Board Department of Environmental Management	Large Water Non-Agricultural Users- e.g. Industrial, Golf Courses, etc.
Narragansett and Mashantucket Pequot Indian Tribes	Indian Tribes
Water Resources Board State Fire Marshal	Local Fire Departments
RI Economic Development Corporation Chambers of Commerce	Industries/Businesses

### **Rhode Island Drought Management Plan**

Part Four, Implementation: Rhode Island Drought Management Plan identifies the actions to take place during the different phases of drought. The actions start with general information collection and sharing under normal conditions and may culminate in declaration of an emergency situation for severe droughts. All response actions in the early phases of drought will be continued in the later stages of drought as needed.

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<b>RHODE ISLAND DROUGHT MANAGEMENT ACTIONS</b>	
<i>Drought Phase: <b>Normal</b></i>	
1.	WRB collects basic weather and hydrological data.
2.	USGS monitors surface and groundwater levels.
3.	WRB works with municipalities on drought related contingency plans and to adopt drought related ordinances.
<i>Drought Phase: <b>Drought Advisory</b></i>	
1.	WRB communicates with public, municipalities and water suppliers about dry conditions.
2.	WRB convenes Drought Steering Committee and recommends to the Governor to declare an advisory phase.
3.	WRB develops press announcements as advised by the Drought Steering Committee.
4.	WRB collects information and advises Drought Steering Committee on list of water restrictions.
5.	WRB coordinates regular meetings of the Drought Steering Committee to review information and circulate educational materials.
6.	WRB works with DEM and USGS in order to expand data collection and monitoring.
7.	WRB forwards "Current Conditions" report to the Drought Steering Committee, general public, municipalities and major water suppliers.
8.	WRB develops and recommends statewide voluntary conservation measures and begins public awareness campaign on water conservation.
9.	WRB works with the DEM and USGS to measure stream flow and groundwater levels and to relay this data to farmers, golf courses, other water users and watershed councils in the affected watershed(s).
10.	DEM-Agriculture mails listing of water conservation techniques to farmers, requests farmers to conserve, and initiates appropriate steps of the Drought Response Plan for Agriculture (See Appendix E).
11.	WRB offers technical assistance to water suppliers to enhance efficiency of their major users

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### *Drought Phase: Drought Watch*

1. WRB distributes monthly Current Conditions Report to the Governor, Drought Steering Committee, major water suppliers, and municipalities.
2. WRB and the Drought Steering Committee recommend to the Governor to declare a watch phase.
3. WRB works with the Drought Steering Committee to develop and distribute clear and consistent public information regarding current conditions and general water conservation measures.
4. WRB offers technical assistance to municipalities on managing water use during dry conditions.
5. WRB works with state agencies to intensify monitoring and appraisal of drought situation.
6. WRB, as advised by the Drought Steering Committee, reports on status of the drought to the Governor, Senate and House leadership.
7. WRB works with state agencies to initiate contact and planning efforts with federal agencies.
8. WRB develops, recommends and encourages continued water conservation and use restrictions.
9. The WRB updates and distributes the statewide map reporting the drought status by region.
10. Large water systems follow triggers and actions from WSSMPs to determine their drought level.
11. DEM-Agriculture continues to implement response plan for agriculture.
12. When rivers approach their 7Q10 low flow (a standard used to measure stream flow), DEM requests voluntary reductions in the quantity of pollutants discharged from industrial sources.
13. WRB works with DEM-Agriculture to provide a list of water suppliers and water transporters willing to supply farmers.
14. WRB develops and distributes a list of well drillers.



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### *Drought Phase: Drought Watch* (continued)

15. DOH provides a list of private laboratories for water testing.
16. DOH expedites permitting and gives priority reviews to replace public wells that have gone dry, where practical.
17. Fire districts/departments identify alternative sources of water or call on a regional tanker force, when water bodies are low.
18. WRB, as advised by the Drought Steering Committee, encourages fire departments to distribute educational materials stating that dry conditions may cause problems for sprinkler systems.
19. DEM expedites dry hydrant permits for fire departments

### *Drought Phase: Drought Warning*

1. WRB, as advised by the Drought Steering Committee, recommends to the Governor to declare a warning phase and WRB works with all constituencies (the public, municipalities, suppliers, etc.) to implement measures to reduce water use.
2. WRB, as advised by the Drought Steering Committee, implements and promotes public information and provides technical assistance to conserve water and reduce water demand.
3. WRB, as advised by the Drought Steering Committee, intensifies media coverage and public education efforts.
4. WRB, works with local suppliers and updates statewide maps to report those regions that have entered the warning stage.
5. WRB, as advised by the Drought Steering Committee, adopts list of non-essential water uses and strongly recommends that water users cease all non-essential water uses.
6. WRB, reviews readiness and availability of emergency interconnections and sources of water.

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### *Drought Phase: **Drought Warning*** (continued)

7. DOH assesses public health threats and acts as needed.
8. WRB, initiates contact and planning with northeast states regarding regional conditions and responses.
9. WRB, works with the Governor's Office to declare a warning phase and to prepare a proclamation for the Governor in case of a drought emergency and develops a communications strategy.
10. WRB, informs the House and the Senate leadership about drought conditions.
11. WRB, as advised by the Drought Steering Committee, coordinates with RIEMA to investigate potential funding and assistance.
12. Individual water systems implement drought-response actions outlined in their WSSMPs.
13. DEM-Agriculture follows steps in the Drought Response Plan for Agriculture.
14. Regulated water suppliers may petition the Public Utilities Commission for emergency rate relief.
15. DEM and WRB identify adverse environmental impacts and advise the Drought Steering Committee regarding mitigation.

### *Drought Phase: **Drought Emergency***

1. WRB, as advised by the Drought Steering Committee, recommends to the Governor to declare an emergency, and recommends to the Senate and House leadership on implementing emergency responses and mitigation measures.
2. The Governor may issue a proclamation of a drought emergency. The proclamation may stipulate mandatory bans on non-essential water use as recommended by the WRB. Water use restrictions shall be in accordance with WSSMPs for large water suppliers. More restrictive measures may be required according to the Governor's Emergency Proclamation.
3. WRB, as advised by the Drought Steering Committee, continues to coordinate the responses of state, local and federal agencies.
4. WRB, as advised by the Drought Steering Committee, coordinates with RIEMA to seek disaster declarations and secure emergency funding/assistance.

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### **Returning to Normal**

To determine the end of a drought, the two key drought indices, precipitation and ground water levels, should be examined. These two indices have the greatest long-term impact on drought conditions. Precipitation is a key factor because it is the overall cause of improving conditions. The drought phase can only be revised downward to a less severe phase when normal conditions for both precipitation and ground water have been reached for a sustained period of time. Complete guidelines are defined on Table 724-(7), Returning to Normal on page 4.29.